

characters. In 1914 he described *D. sabensis* from Tenom, Sabah, collected by Miss Gibbs, the collection being rather fragmentary; in describing it he referred to it as being similar to *D. sparsiflora* Becc., but differing in the leaflets being irregularly pinnate and of a thinner subherbaceous texture, and somewhat resembling *D. longispatha* especially in the male spikes which resemble a grass inflorescence. No mention is made of *D. longipes*. In 1935 Furtado described *D. calothyrsa* based on *Clemens* 29194 (pistillate) and 29193 (staminate) from Kinabalu. He distinguished it 'from all the others belonging to *D. longipes* group by its fruits which are, even in their younger stages, long and narrow having their fruit-scales in 12 rows'. Furtado discussed *D. sabensis* and stated that it is said to have male flowers arranged as in *D. longispatha* and not as in *D. longipes*. *D. calothyrsa* was distinguished from *D. longipedunculata* on the larger and more frequent spines at the apex of the sheaths. This species was also said to have fruit twice as long as broad. *D. longipedunculata* is based on *Clemens* 31280 (type) and several other collections. It is described as being very similar to *D. virescens* and *D. longipes* 'but is readily recognized from either of these by its distinctly grouped leaflets'. I see no significant difference between the isotypes of Furtado's two species; they differ from *D. longipes* only in the rather oblong fruit. *D. longipes* is so variable throughout its range that *D. longipedunculata* and *D. calothyrsa* easily fit within that range; similarly *D. sabensis* is indistinguishable—I find it most surprising that Becari suggested its affinities were with *D. longispatha* and *D. sparsiflora*.

D. virescens is probably conspecific but I have had no material at my disposal.

15. ***Daemonorops longistipes*** Burret in Notizbl. Bot. Gart. Mus. Berlin-Dahlem 15: 798 (1943). Type: Borneo, Kinabalu, *J. & M. S. Clemens* 30830 (holotype ? B; isotype K, SING).

Daemonorops elongata var. *montana* Becc. ex Gibbs in J. Linn. Soc. Bot. 42: 169 (1914). Type: Borneo, Kinabalu, *Gibbs* 3983 (lectotype BM, (chosen here)); **synon. nov.**

? *Daemonorops pleioclada* Burret in Notizbl. Bot. Gart. Mus. Berlin-Dahlem 15: 797 (1943). Type: Borneo, Kinabalu, *J. & M. S. Clemens* s.n.

A short climbing species of *Daemonorops*, abundant in the lower montane forest of the Crocker Range and Kinabalu; it is very variable, and occurs in large populations displaying a range from slender to robust stems and ovoid to depressed-globose fruit of varying size. This taxon belongs to the notoriously difficult complex of taxa related to *D. hystrix*. Beccari described one form as a variety of *D. elongata*, yet the taxon lacks the irregularly pinnate leaf and small rounded fruit of this species. Burret described the same taxon as *D. longistipes*, this being the first name at the specific level. His *D. pleioclada* appears, from the description, also to fit within the range of variation of *D. longistipes* but I have been unable so far to locate the type. I believe this taxon requires specific status, and it is certainly very different from *D. elongata*.

16. ***Daemonorops serpentina*** *J. Dransf.* sp. nov. habitu acaulescenti foliolis comptis regulariter dispositis ad *D. acamptostachydem* accedens sed inflorescentia pistillata laxiore, floribus majoribus, fructibus majoribus ovatis vice sphaericis et inflorescentia staminata multo laxiore, rachillis fractiflexis vice strictis differt; quamquam flores staminati non suppetentes, propter mag-

nitidine₁₁ areoli, quam in *D. acamptostachyde* verosimiliter multo majores. Typus: Borneo, Sabah, *Dransfield* JD5790 (holotype K; isotype SAN).

Clustering \pm acaulescent rattan. Stem erect, very short, with numerous congested nodes; leaves to 2.2 m held neatly and rather stiffly giving the whole plant a shuttlecock appearance. Leaf sheathing in the basal c. 25 cm, but in age usually splitting along the entire length of the sheath opposite the petiole, leaf base pale buff tinged greenish, densely covered in reddish-brown tomentum and armed with oblique partial whorls of narrow triangular laminar dark spines to 20×4 mm, erect in bud, reflexed on exposure, and, opposite the leaf axis, armed with partial whorls of spicules; sheathing portion of leaf base terminating in a truncate ciliate hairy ocrea to 3 cm, this tattering and disintegrating; petiole to 50×1.5 cm in the proximal part deeply channelled adaxially, the channel decreasing in depth distally until petiole semi-circular in cross-section; petiole armed as the sheath, but spicules absent; rachis yellowish, armed with very sparse short reflexed spines and caducous brown indumentum, the rachis sometimes produced beyond the terminal leaflet pair, as a vestigial cirrus c. 5 cm; leaflets c. 40 on each side of the rachis, stiff, coriaceous, very regularly arranged, the whole leaf having a very neat appearance; most proximal leaflets to 20×1.5 cm; mid-leaflets to 50×3 cm, tending to be acuminate in a drip tip; apical leaflets to 14×1.5 cm; leaflet surfaces armed with sparse black bristles on the ad- and ab-axial surface of the midrib; transverse veinlets sinuous, very close, not very conspicuous. Staminate and pistillate inflorescences superficially similar, erect, 60–100 cm; peduncle laterally compressed, to 80×0.8 cm unarmed or with very sparse black spines borne on the margins, the whole densely covered in reddish-brown tomentum; prophyll unarmed to 15×1.5 cm, papery in texture, splitting down its entire length opposite its axis; partial inflorescences usually three, c. 8–11 cm distant; staminate inflorescence branching to three orders, pistillate to two; staminate rachillae somewhat crowded, to 15 mm (very rarely to 25 mm) $\times 1.5$ mm \pm zig-zag in appearance; bracts c. 1 mm long, with a low triangular tip, densely covered in dark brown tomentum; involucre c. 1 mm; flower areole c. 1.5 mm diam.; staminate flowers not known (already fallen); pistillate rachillae laxer than in the staminate, to 60×2.5 mm; bracts collar-like, c. 1 mm high; involucrophore pedicelliform to 4×2 mm, the limb low triangular; involucre collar-like c. 1 mm high; areole of sterile staminate flower crescent-shaped, 2.5×1 mm; areole of pistillate flower, polygonal, c. 3 mm diam. Pistillate flower to 7 mm; calyx tubular in the basal 2 mm, with three broad triangular striate apiculate lobes to 4×3 mm; corolla with three narrow triangular petals to 7×2.5 mm, joined to form a tube at the base (post anthesis ovaries only available). Fig. 10.

SABAH. Telupid, Bt. Tangkunan, *Dransfield et al.* JD5790 (holotype K; isotype SAN), JD5791 (K, SAN); Labuk, Pulau Sapi, Bt. Merongo, *Dransfield et al.* JD5734 (K, SAN).

Confined in the lowlands to rather exposed areas of forest on ultrabasic rock—areas such as ridgetops and steep slopes where the light intensity reaching the forest floor is high.

Observed throughout the eastern part of Sabah on ultrabasic hills.

This is a very distinctive species in the field; the acaulescent habit with the stiff neat leaves give the plant a shuttlecock-like appearance. In this respect it

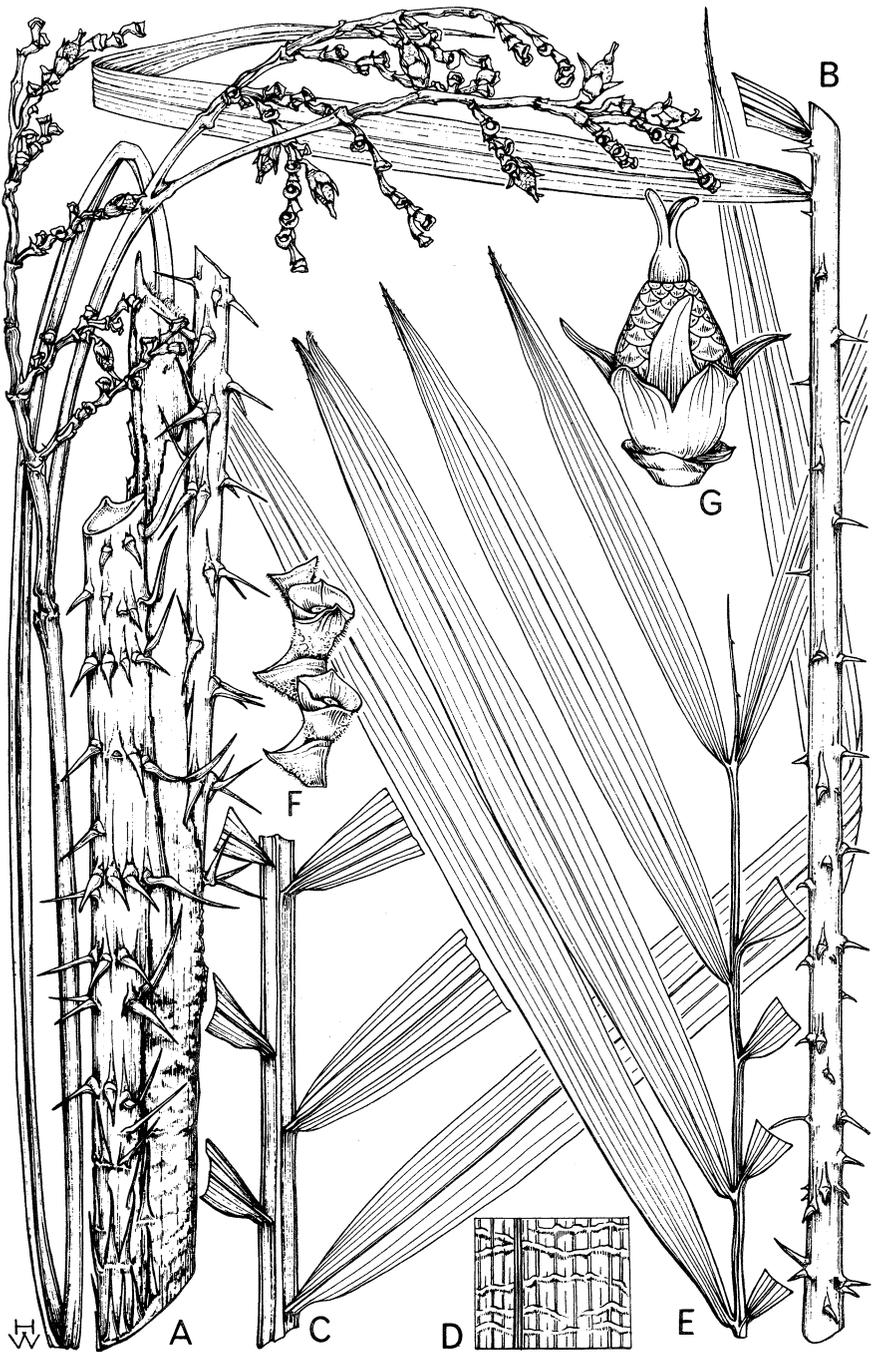


FIG. 10. *Daemonorops serpentina*. **A** stem apex with leaf sheaths $\times \frac{1}{2}$; **B** portion of petiole $\times \frac{1}{2}$; **C** mid-portion of leaf $\times \frac{1}{2}$; **D** detail of lamina $\times 5$; **E** leaf tip $\times \frac{1}{2}$; **F** detail of staminate rachilla $\times 4$; **G** young fruit $\times 3$. **A**, **C**–**E**, **G** from Dransfield JD5790, **B**, **F** from Dransfield JD5791. Drawn by Heather Wood.

approaches *D. acamptostachys*, a rare rattan of kerangas forest in Sarawak; inflorescence details suggest the two species are related (papery nature of bracts, long peduncle and crowded rachillae in the staminate plant). *D. acamptostachys* however has extraordinarily densely crowded staminate flowers borne on straight rather than zig-zag rachillae and the fruit in *D. serpentina* is ovate and about twice the size of the spherical fruit of the other species.

17. ***Daemonorops banggiensis* J. Dransf.** palmijuncus robustus caule brevi intra gregem *D. hystrioides* ponendus spinis vaginarum foliorum gracilibus densissimis, geniculo haud evoluto, foliolis seriebus 3 supra setis sparsis infra serie unica setarum conspicuarum armatis differt. Typus: Borneo, Sabah, Dransfield JD5666 (holotypus K; isotypi KEP, L, SAN, SAR).

Robust clustering short-stemmed rattan with stems decumbent or climbing to 3 m only; stem without sheaths c. 20–25 mm diam., with sheaths 30–40 mm; internodes 8–12 mm. Leaf sheaths usually splitting for considerable lengths opposite the petiole, pale yellowish-green when fresh, drying brownish, very densely armed with dull grey spines of varied length and alignment, scattered or arranged in horizontal or oblique partial whorls, below the petiole to 40 × 3 mm and ± reflexed, by the leaf sheath mouth much longer, to 120 × 4 mm, erect, often ± papery; dark chocolate brown indumentum present on young sheaths, usually quickly falling. Knee hardly developed. Ocrea inconspicuous. Leaf cirrate rather massive to 2.5 m including short cirrus to 40 cm and petiole to c. 40 cm; petiole semi-circular in section, c. 15 × 10 mm, ± channelled near the base, heavily armed near the base with marginal groups of pale grey spines to 60 × 3 mm, held ± at 80° to the petiole, and short erect spines to 10 mm; in distal portion armature shorter and sparser; petiole continuing into rachis, but much more sparsely armed on the abaxial surface only; leaflets c. 60 on each side of the rachis, close and regularly arranged, coriaceous, bright green, concolorous, the most proximal to 30 × 1.7 cm; mid-leaf leaflets to 35 × 2.4 cm, decreasing to 16 × 1.7 cm at the base of the cirrus; leaflets armed with very short marginal teeth, short sparse bristles on three nerves on adaxial surface, and with a conspicuous row of close bristles to 1.5 mm on abaxial surface of main vein; transverse veinlets very crowded, somewhat sinuous, rather obscure. Staminate inflorescence to 70 cm with short basal peduncle to 5 cm; prophyll c. 25 × 4 cm, ± woody-textured, very densely armed with grey-black, pale yellowish based spines to 25 mm, with a few flat erect papery spines to 60 mm at the very tip, and abundant floccose brown indumentum; other primary bracts decreasing in size distally, armed ± as the prophyll, but less densely so; partial inflorescences up to 10, ± 5–10 cm distant on expansion, the longest to c. 10 cm; bracts on first order branches rather thin and papery c. 5 × 1.5 cm; proximal partial inflorescences rather congested with sinuous rachillae; rachillae very slender to 4 mm bearing c. 4 flowers each subtended by two minute bracteoles. Staminate flower c. 2.5 × 1.5 mm; calyx c. 0.4 mm with three short teeth; corolla tubular at very base, with three ovate petals to 2.1 × 1.0 mm; stamens six with short filaments and anther c. 1.1 × 0.2 mm. Pistillate inflorescence as the staminate but shorter, branching in two orders only; rachillae c. 25 × 2 mm, distinctly brown indumentose; rachilla bracts and bracteoles very low, inconspicuous. Sterile staminate flower as the fertile